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Thirty-sixth annual report of the work of the Fabian Society for the year ended March 31, 1919. (London: Fabian Soc. 1919. Pp. 20.)

Rechenschaftsbericht über die Tätigkeit der Verbandsbehörden für das Jahr 1918. (Basel: Verband Schweiz Konsumverein. 1919. Pp. 136.)

Statistics and Its Methods

The Review of Economic Statistics. Preliminary Volume, No. 1. (Cambridge, Mass.: Harvard University Committee on Economic Research. January and April, 1919. Pp. 212. Subscription price \$100.)

The establishment of this periodical promises to mark a new stage in the development both of economic research in the universities and of business forecasting for the public.

In 1917 Harvard University appointed a committee consisting of Professor Charles J. Bullock, chairman, Dean Edwin F. Gay, and six men of affairs to plan more adequate provision for scientific investigation in economics. After canvassing various projects this committee decided that its first enterprise should be the cultivation of economic statistics. They secured the services of one of the ablest workers in this field, gave him an adequate staff of assistants, and in due time set up an organ of their own "to promote the collection, criticism, and interpretation of economic statistics, with a view to making them more accurate and valuable than they are at present for business and scientific purposes." This organ, the chairman of the committee promises, will follow three lines of work: investigation of the sources and probable accuracy of existing statistical data; collection of additional data in cases where this may prove desirable and practicable, and the application to economic statistics of modern methods of statistical analysis.

The *Review of Economic Statistics* is a sumptuous folio-sized quarterly, of about 100 pages per issue, abundantly illustrated by charts admirably drawn. Together with a monthly supplement of current data, the *Review* is offered to the public at \$100 a year. Besides being an ultra-scientific journal, the *Review* is thus a competitor of commercial agencies for purveying and interpreting up-to-date figures for business men. Nor are its prospects in this competition necessarily dim. If some of the *Review's* charts are difficult to understand, some of its rivals' charts are impossible to understand. Most business men take their statistics on faith,

and a Harvard Committee on Economic Research will inspire more faith than any commercial agency. If its academic dignity does not preclude enterprising salesmanship, the *Review* should find sufficient subscribers to pay its way.

On the scientific side there is no doubt about the success of the first two issues (January and April, 1919). In these numbers Professor Warren M. Persons summarizes, systematizes, and extends that series of researches into indexes of business conditions which marked him out as the fittest editor for the study.

Adopting the working hypothesis that each business index "is a composite consisting of four types of fluctuations," Professor Persons develops methods of isolating and measuring each type in turn. (1) The secular trend of all the series so far treated is found by fitting straight lines to the data by the method of least squares. (2) Seasonal variations are measured by taking medians of the month-to-month percentages, turning these medians into continuous series, distributing the secular trend, and equating the average of each twelve months to 100. (3) To get cyclical variations "each monthly ordinate of secular trend is multiplied by the index of seasonal variation for that month: the resulting product is subtracted from the corresponding original item, and then expressed as a percentage of the ordinate of secular trend." Finally, the percentage deviations thus obtained "are expressed in terms of their respective standard deviations, in order to secure comparable cyclical fluctuations." (4) The last type of variations, "residual fluctuations, due to developments which affect individual series, or to momentous occurrences, such as wars or national catastrophes, which affect a number of series simultaneously," cannot be distinguished from the cyclical fluctuations simply by study of the statistical data. Interpretation "in the light of contemporaneous economic events is necessary" (p. 33). Yet in the face of this remark, Professor Persons has isolated the irregular fluctuations in one of his indexes (the value of building permits) by statistical analysis. By eliminating the secular trend and the seasonal variations from the original data he obtained a series that showed the cyclical and irregular fluctuations combined. Next by the use of twelve-months moving averages he eliminated the irregular fluctuations. He then had two series, one containing both cyclical and irregular fluctuations, the other containing only cyclical fluctuations. The differences between the paired items of these series were, "presumably, approximations to

the irregular fluctuations." When the irregular fluctuations thus ascertained were charted, they fitted the normal curve of distribution with remarkable closeness (pp. 137-139). From the statistical viewpoint, this bit of analysis is perhaps the most elegant of Professor Persons' contributions.

Twenty-three of the best-known indexes of business conditions covering the years 1903-1918 are analyzed on the plan just sketched, and the results are given at length in the January and April issues of the *Review*. In the April issue another step is taken. Twenty of the indexes are combined into five group indexes which "epitomize the business situation." The basis of combination into group indexes is synchronous fluctuation. That is, two or more series are combined when their coefficients of correlation are significant in degree and reach their maxima when items for the same dates are paired. Still further compression of the indexes yields three curves which show clearly the normal sequence of certain events in business cycles. The "index of speculation" (bond yields, prices of industrial and railroad stocks, and New York clearings) has cyclical variations which systematically precede those of the "index of physical productivity and commodity prices combined" (pig-iron production, outside clearings, Bradstreets' and the Bureau of Labor Statistics price indexes, and New York bank reserves). In turn, the cyclical fluctuations of the latter index systematically precede those of the "index of the financial situation in New York," (interest rates on 60-90 day and 4-6 months paper, New York bank loans and deposits).

But—and the fact shows the great complexity of the problems with which Professor Persons is dealing—the regularity of succession in the fluctuations of these three indexes is limited to the pre-war years (1903-1913). The systematic relations both among the individual and among the group indexes were "shattered by the outbreak of war." "It may be said that, in general, the order of the series as to lag was completely reversed." For example, "commodity prices and interest rate, which usually rise and fall four to eight months after bank clearings and pig-iron production, were the first to feel the effects of the economic cataclysm" in the summer of 1914 (p. 128). Hence, the "Index of General Business Conditions . . . obviously is of no value in interpreting the connection that existed during the Great War, but it is offered in the belief that it will prove serviceable in the study of conditions following the establishment of peace" (p. 117).

Of the three lines of statistical work marked out in the prefatory statement of the *Review*, this summary shows that only two lines have so far been developed—investigation of existing data and the application of refined methods of analysis. Along the remaining line, collecting additional data, no results are published as yet. It is to be hoped that the editor and his staff are planning a campaign in this promising direction. American statistics of unemployment, production, savings, collections, and credit—to mention concrete examples—are woefully fragmentary. Much might be done by a group of disinterested workers, backed by the prestige of Harvard University, to collect and combine data which are now largely wasted in private files.

That prompt attention has not been given to this range of work may be due to the editor's personal equation. Interest in content and interest in method are seldom highly developed in the same mind. Professor Persons has a mathematical bias; "the application to economic statistics of modern methods of statistical analysis" is the work he loves. Hence he can bear to postpone the task of organizing new sources of statistical information. Perhaps the postponement is wise. At any rate we cannot justly complain because the *Review* does not do everything first. But, and here complaints are just, Professor Persons is prone to lavish labor on the refined analysis of raw materials he might easily have bettered. Not the only, but the clearest, example of this failing is his use of the *Wall Street Journal's* average prices of industrial and railroad stocks. Though pointing out with characteristic candor the defects in these indexes (pp. 146,147), Professor Persons calculates their secular trend, cyclical fluctuations, and coefficients of correlation with other series. With a little direction, one of his assistants might have compiled from the published tables of security prices indexes that have a far better claim to refined elaborations. Indeed, had the construction of better index numbers of stock prices been a puzzling mathematical problem, I fancy that Professor Persons would have solved it.

This over-eagerness to plunge into the fascinations of analysis however, is the worst blemish on a shining record of achievement. Not only has the *Review* set a new standard of thoroughness in the study of business indexes, but it has also cleared the way toward less familiar lines of research. The problem of secular trends in particular stands out distinctly in the background of Professor Persons' charts and tables. Why do different indexes of economic

activity show such marked diversity of secular trend; what is the meaning of these differences in terms of work and welfare; what causes produce the turning points that appear in most of the trends; why do the turning points of many trends coincide? Here is a set of themes which should fascinate some group of workers adequately furnished with statistical technique, knowledge of economic history, and theoretical insight. Professor Persons' results would set them going and Mr. Edwin Frickey's simple method of computing secular trends (pp. 210, 211) would facilitate their preliminary surveys of new data.

In a still larger sense the *Review* rouses high hopes. It is an experiment in the endowment of economic research. The fact that Professor Persons has been able to go so much farther than any of his predecessors in the statistical study of business cycles is due in part to the fact that he has had a staff of trained assistants to try out his notions and that he has been enabled to devote his own time unreservedly to investigation. Every economist will hope that the early success of the *Review* will be maintained, and that the example set by the Harvard Committee on Economic Research in providing the best of working conditions for keen investigators may be followed by other enlightened groups.

WESLEY C. MITCHELL.

New School for Social Research.

Vital Statistics. An Introduction to the Science of Demography.

By G. C. Whipple. (New York: John Wiley and Sons. 1919. Pp. xii, 517. \$4.)

As the first textbook of vital statistics to be produced in the United States this book is to be accorded a warm welcome. The author is professor of sanitary engineering in Harvard University and his work is dedicated to the students of vital statistics in the School of Public Health of that university and of the Massachusetts Institute of Technology. In the preface, he modestly confesses that he "is not an authority on vital statistics, much less an authority on demography; he is merely a student of the science."

The only book in English with which this work naturally invites comparison is Dr. Newsholme's *Elements of Vital Statistics*. I believe that this volume will be found as satisfactory a textbook for persons preparing to be health officers under present conditions in the United States as Newsholme's book has long been for persons looking forward to the same career in England. Indeed